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UNILATERAL OPHTHALMOPLEGIA, PROBABLY DE-
PENDENT UPON THROMBOSIS OF THE CAVER-
NOUS SINUS WITH ASSOCIATED
BASIC MENINGITIS.

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The following case has many points of clinical and pathological interest, and similar cases are of rare occurrence.

The patient, E. R., 55 years of age, was admitted to the Women's Nervous Wards December 4, 1890, in a condition of dulness and suffering. Her history, for several weeks before admission, was first obtained from a friend who boarded in the same house with her, and who seemed to be conversant with her health and affairs. This man stated that for about eight weeks she had suffered from neuralgic pains, which had gradually increased. They had begun in the left side of the face and around the left eye, but had spread, until they were diffused over the side of the head and back of the ear. She was compelled, because of the distress, to quit work two weeks before admission, and had been treated by several physicians but with no benefit. No history of syphilis could be obtained, but this by no means made it sure that this causative factor did not exist. She had not been drinking for fourteen months, although previous to that time she had been an irregular drinker.

Five years before she had been a patient in the surgical wards of the hospital, and at that time had undergone an operation for the removal of the coccyx. Probably one week before admission—exactly when could not be learned—she began to lose control of the movements of the eye and of the eye-lid, the paralysis of the various ocular muscles rapidly deepening, so that the day before admission the eye had become completely immobile.

She was carefully examined shortly after admission. Her mental condition was one of dulness. She moaned and complained of pain, which she chiefly referred to the region above, around, and back of the eye. The left eye-ball was fixed and apparently somewhat protruding. She could not by the strongest effort of the will move this eye in any direction. The left upper lid drooped, an almost complete ptosis; the pupil of the same eye was dilated and irresponsive to light and accommodation.

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Dr. G. E. de Schweinitz, ophthalmologist to the hospital, examined her a few hours after admission. No optic neuritis was present, and the patient's vision in both eyes was then good. Ophthalmoscopic examination showed slight haziness of the edges of the disc of the left eye, the veins fuller, and a few spots of fatty change in the choroid at the lower inner portion of the fundus. The conjunctiva was not injected at this time, and the lachrymal apparatus was normal. Nothing abnormal was discovered in the right eye.

The ears and hearing were also examined. The left drum was retracted, pearly white, gave a small light reflex and showed no perforation. Pressure on the superior wall of the external canal gave pain, and here was a small spot of redness with the appearance of granulations. Pressure over the mastoid, and also in front of and above the ear for a considerable distance, caused wincing and other active indications of suffering. Hearing was much impaired in this ear, but the degree of loss was not accurately determined. The diminution of hearing in this ear had begun about two weeks before admission and had gradually increased. In the right ear she had been very hard of hearing, almost deaf in fact, for many years, the result of an otitis of childhood.

An examination of her ears and hearing was also made a few days later by Dr. C. Jay Seltzer, who reported as follows: Left ear—slight deposit of cerumen on the walls of the external meatus. Membrane relaxed but translucent. Bone conduction over the mastoid and temporal region good. Hearing for voice slightly diminished; watch tick at one inch. Right ear—watch tick at one inch. Post-nasal space too narrow for examination because of congenital stenosis. Hypersecretion with incrustation. Diminished hearing in this ear due to catarrh of middle ear. Smell was impaired on the left side.

Examination for sensation showed loss to pain, temperature and touch, beginning near the vertex and extending downward to the left of the median line, and outward to the line of the outer angle of the orbit, involving the lids, the cheek beneath the eye, the side of the nose and the upper lip. The conjunctiva was almost completely anæsthetic. Anæsthesia was also present on the left side in the tongue, the gums, the roof of the mouth, and mucous membrane of the cheek. This loss of sensation was deepest below the eye. Over the forehead and left eyelid it was not so decided. As already stated, areas painful to pressure were present over the mastoid process, in the auditory canal, at a spot in front of the ear, and generally the left side of the scalp and upper face. The most tender places were those in front and back of the ear. She complained of numbness on the left in the lower lid, the nasal aspect of the cheek, the nose, and the lip; also of pain generally distributed over the left side of the head, and a feeling of discomfort or pain referred to the back of the eye.

She had an unhealthy mouth, and complained of much discomfort in the gums, teeth and stumps, particularly well back on the left side. She sometimes spoke of having a dumb, heavy pain in the mouth. Detailed examination showed that on the right side she had lost the molars and bicuspid, and in the left lower jaw the wisdom tooth and one bicuspid. The left upper molar and remaining bicuspid were jagged decayed stumps. In the left lower jaw all the molars and bicuspid had been removed. The incisors were present in both jaws, but were loose and irregularly placed. The gums were retracted and somewhat spongy. Handling the stumps of the bicuspid and the molars in the left upper jaw gave her pain. Some of the pain caused by pressure in front of the ear seemed to be due to the decayed teeth.

A thorough examination was made with the view of determining, if possible, whether or not the proptosis was due to tumor, abscess or other lesion in the back part of the orbit. The eyeball could be nearly dislocated without pain, until the optic nerves could almost be reached, and this examination was convincing that no gross orbital lesion that could account for the protusion of the eye was present in the orbit.

Her tongue was coated and her breath offensive. Temperature, pulse and respiration were practically normal, temperature occasionally rising a little. No palsy, anæsthesia or changes in reflexes were present in the limbs, or anywhere, except as above noted.

The day after admission she was put upon twenty grain doses of sodium salicylate every two hours, on the supposition that she might have an uncomplicated neuritis involving the various cranial nerves paralyzed. After the first dose her loss of hearing decidedly increased, and in twenty-four hours had gone on to complete deafness; at the same time, no appreciable effect was produced upon the pain and paralysis. When the sodium salicylate was discontinued her hearing improved, and in about forty-eight hours was about the same as when she was first admitted.

She now complained of pain in and behind the right eye, and the right lid drooped slightly. The movements of this eye did not, however, appear to be affected, but she had, or thought she had, some haziness of vision.

One week after admission it was discovered that she was nearly blind in the left eye, and in a few hours this loss of sight was complete. The blindness had apparently come on rapidly in a few days, as it had not been discovered at the previous examinations made during two or three days after admission.

The subsequent history of this case, up to the time of writing the present paper, can be briefly recorded. After several consultations, chiefly with reference to the propriety of operating either for mastoid or aural disease, or for intra-cranial tumor, it was decided to first place her upon thirty grains of sodium iodide, three times daily, and mercurial inunctions; and these remedies were directed to be continued until constitutional effects were induced.

Within forty-eight hours she showed signs of improvement, particularly in her general condition and in the pain. The dulness of mind passed away, and day by day the pain and tenderness decreased, so that in ten days she was practically free from pain. The right eye showed no further tendency to become involved; the areas of anæsthesia slowly decreased.

Two weeks after beginning this treatment sensation was good in the roof of the mouth, and in the tongue and cheek, and the anæsthesia on the outside of the face and head was now limited above by a line four inches above the superciliary ridge, below by one parallel with the lower border of the nose, within by the middle of the left aspect of the nose, and outside by a line drawn through the external canthus. Tenderness was limited to the temporal region and was slight. No improvement in the motor paralysis had, however, taken place. The only unfavorable active symptom which appeared was conjunctival inflammation, probably trophic, both the bulbar and the tarsal conjunctivæ becoming red and swollen. The bulbar conjunctiva was pressed and folded into a ridge across the eyeball, just below the line of the iris. Under treatment by compresses of boracic acid, atropine, etc., this inflammatory condition gradually subsided.

At the time of making this report, about six weeks after her admission, the patient is free from both pain and tenderness, anæsthesia is limited to the small area above described, and the right eye is in a healthy state. The proptosis, immo-

bility of the left eye, cycloplegia and iridoplegia still remain. The active inflammation within the cranium seems to have been arrested, but the patient is left with the ophthalmoplegia, which had resulted from inflammation, compression, and degeneration of the cranial nerves.

During the progress of this case, the patient was seen by Drs. de Schweinitz, Dercum, Lloyd, Hearn, Porter, and Seltzer, of the hospital staff. Among the diagnoses suggested and discussed were neuritis, gross lesion of the orbit, cavernous thrombosis, basic meningitis, aneurism or tumor at the base, and nuclear ophthalmoplegia. At one time it was considered probable that the case was one of inflammatory thrombosis connected with disease of the ear; at another, the same affection, but originating in the mouth. The advisability of operating for mastoid or aural disease, and even for basal tumor, was considered, but surgical interference was decided against after consultations. The worst teeth, however, were extracted, and efforts were made to put her mouth into as healthy a condition as possible.

Coupland¹ has reported a case of ophthalmoplegia dependent upon thrombosis of the cavernous sinuses which has many points of interest in connection with the diagnosis of the position and character of the lesion in this case. As the patient died on the third day after admission to the hospital, and as an autopsy was held, obscurities were cleared away, and the case is unusually instructive. Before admission to the Middlesex Hospital, where she was under Dr. Coupland's care, she had been a patient at the Royal Ophthalmic Hospital, Moorefields, under Mr. Burke, and notes of her case had been taken by Mr. W. Gay. Both father and mother had died of phthisis. Nothing suggestive of syphilis could be obtained. In November, 1885, she began to suffer from dreadful pain at the back of the eye and in the head, and she became deaf in the left ear. In two weeks she had diplopia and squinted, and in four weeks drooping of the left lid was noticed. January 16, 1886, marked proptosis of the left eye was present, and movements of the left eye had nearly disappeared. She had no outer movement at all in this eye. In the right eye the cornea did not quite reach the outer canthus, and the eye oscillated. The left pupil did not contract to light; the right was sluggish; both contracted to accommodation. Ophthalmoscopic examination showed nothing abnormal. On February 3, it was noticed

¹ Trans. Ophthalmological Society of the United Kingdom, Vol. V., 1886-87, p. 228-234.

that the right eye became bad after severe pain in the head, the left eye seeming to get better. Movements in both eyes, however, steadily decreased. She had much shooting pain in the right frontal region. The pupils ceased to contract to accommodation as well as to light, and vision steadily diminished. Ophthalmoscopic examinations were negative. "The sum total of her condition when attending Moorfields was: Proptosis, and more or less complete ophthalmoplegia externa of the left eye, following great supra-orbital pain, succeeded by proptosis of the right eye, with ophthalmoplegia externa and interna, (?) but with no distinct ophthalmoscopic changes."

On February 22, she was suddenly attacked with severe pain in the head and became unconscious, but the next morning spoke intelligently and rationally. After this she lapsed into a drowsy state.

The case is so well recorded that I will give the succeeding notes entirely in the language of Mr. Coupland.

"A rather ill-nourished woman lying low in bed, somnolent, occasionally moving her hands about in a purposeless way; can be roused by being addressed in a loud voice, and to the query whether she is in pain, she points to the right side of her forehead. The hair, which is thin, is brown interspersed with gray, a considerable lock of gray hair being seated over the right frontal region. There is notable tenderness of the scalp, especially in the left temporal region. The skin is dry, face dusky, slight injection of cheeks, but no enlargement of veins around orbit or elsewhere. The lips are very dry; the tongue dry and brown on dorsum, moist and creamy at margins.

"There is marked proptosis of each eyeball, to about an equal extent on both sides. There is complete ptosis on the right side, partial on the left; the lid, when raised voluntarily, uncovering about half the pupil. The right eye is absolutely immobile in any direction, and the left is nearly in the same condition, save for slight power of movement inwards, but not outwards. When at rest there is slight divergent strabismus. Owing, however, to the patient's mental condition, and the necessity for raising the lids to observe the eyes, examination is not satisfactory. Both pupils are large, the right being more dilated than the left, but neither reacts at all to light. Atropine causes slight dilatation of the left pupil.

"There is no optic neuritis; the vessels, both arteries and veins, in the right fundus, are comparatively small, the disc well defined and pale; the vessels are larger in the left fundus and the disc is slightly swollen, but its margin is well defined. On each side the conjunctiva is suffused, that of the left eye being more injected; both are quite insensitive, and the cutaneous sensibility of the face is impaired over left side as compared with right, though not entirely lost. There is no facial paralysis. There is deafness, but to what extent, or whether one ear is more affected than the other, the state of the patient does not admit to ascertain. For the same reason it is impossible to test her visual power. There is no discharge from either ear; there is some difficulty in swallowing; the tongue is protruded straight.

"The patient keeps her arms mostly folded across her chest, and there is very slight rigidity; when the elbows are extended she soon replaces the hands in the former position. The legs are flaccid, but the patient has some control over their movements. There is no plantar reflex on the right side, and but slight on the left; the abdominal and epigastric reflexes are absent on both sides. The knee jerk is absent on both sides; no ankle clonus can be elicited. Sensation is blunted over both lower extremities, more on the right than the left side, and more on legs than thighs. It is also deficient, but not absent, over the chest and abdomen. There is loss of voluntary power over the bladder.

"A mixture of iodide of potassium and mercury was prescribed. The following day her condition was unchanged. She lay with her head turned to the left, and cried out with pain if it was attempted to move it to the middle line. She muttered to herself constantly, but did not answer questions as a rule. Once when asked to draw the legs up, however, she said 'I shan't.' There is some conjunctivitis of the left eye.

"On March 12th she became rapidly worse. Pulse 148; respirations 60; face and lips vivid; coma deepening. She still lay with her head turned to the left, and pain was still elicited on movement, otherwise she did not speak at all. The left conjunctiva is more inflamed and chemosed in the lower half. About 6 P. M. stertorous breathing set in, and at 11.20 P. M. she died.

"The post-mortem examination, which was made by Dr. W. Pasteur, revealed basic meningitis, a considerable quantity of lymph covering the interpeduncular space and following the middle cerebral arteries for a short distance. The third nerves were quite imbedded in the exudation. The arteries were pervious; no evidence of tubercle. The dura mater in the anterior part of the posterior fossæ of the skull was also coated with soft, easily detached lymph (especially in the region of the body of the sphenoid and the clinoid processes), as far down as the medulla.

"The pituitary body was enlarged to nearly the size of a Barcelona nut, very vascular, but not apparently the seat of any morbid process. The cavernous sinus on each side was completely occluded by thrombus of old date; in the right sinus the contents were caseo-purulent; in the left, colorless and friable, not purulent. The circular and transverse sinuses were also full of pus and caseous looking material. The dura mater investing the sella turcica and body of the sphenoid was abnormally loose, and could be easily detached, but no disease of bone could be made out. The petrosal and other sinuses were empty. The tympana and mastoid cells did not show any signs of inflammation nor pus. There was a marked excess of cerebro-spinal fluid.

"The brain substance was unduly soft, and there was well marked dilatation of the lateral ventricles (posterior cornua especially). No lesion of any kind was found in the brain, pons or medulla. A portion of the lower cervical and upper dorsal cord was examined and appeared healthy to the naked eye. There was no affection of the spinal membranes."

In many of its features our case resembles the one reported by Coupland. In both proptosis and ophthalmoplegia externa beginning on the left, with more or less deafness, and pain in the head and back of the eye were present. Coupland's case went on to involvement of both sides and eventually to death, while in the

our case, under the heroic use of sodium iodide and of mercury, the disease halted and the right nerves which were apparently threatened, did not become decidedly affected. It seems highly probable that the left cavernous sinus in our case may have been occluded by a thrombus, and that we had phlebitis chiefly confined to the left side. Coupland believes that in his case the left sinus was the first to become implicated, and it is probable that the plugging of the right sinus took place by way of the circular and transverse sinuses. He regarded the basic meningitis as secondary to the inflammation of the sinuses. Looking upon our case in the light of the same theory, it is probable that both phlebitis and meningitis have subsided under the treatment instituted, but that improvement did not take place soon enough to save the implicated nerves. The absence of marked symptoms of obstructed venous circulation was notable in both cases. They did not present oedema of the eyelids or other parts, nor enlargement of the facial veins, nor venous engorgement within the eye. In neither of the cases can the temporary deafness be thoroughly accounted for, but it may have been due to diffusion of the phlebitis and meningitis.

Coupland refers to the occurrence of phlebitis, which, having originated in the nasal buccal or pharyngeal cavities has extended by anastomosing veins through foramina in the floor of the skull, to the intracranial veins, sinuses and membranes. This is suggestive in connection with the condition of our patient's mouth. Alveolar abscess and necrosis of the jaw, facial phlebitis from erysipelas, facial and labial carbuncle, and orbital inflammations, have, according to him, been followed by inflammation of intracranial vessels and membranes, and have sometimes resulted in thrombosis of cavernous sinus.

An intimate connection between the veins of the mouth, face and pharynx, and those of the cranium is by way of the foramen of Vesalius. The middle meningeal veins, the deep temporal, the pterygoid, masseteric, buccal, alveolar, some palatine veins, and the inferior dental, form the pterygoid plexus, and this plexus communicates very freely with the facial veins and with the cavernous sinus through the foramen of Vesalius. (Gray's Anatomy.)

In the same volume of the Transactions of the Ophthalmological Society of the United Kingdom, in which appears the article of Coupland, are several other papers on ophthalmoplegia.

In one of these by A. H. Robinson, M.D. and J. Hutchinson, Jr., several cases are reported, two of them much like the one here recorded. In one of the two a post-mortem examination was held, and the other recovered under specific treatment. The post-mortem examination showed thrombosis, and inflammatory lesions almost confined to the region of one cavernous sinus.

With reference to the diagnosis of neuritis it need only be said that the history and progress of the case render it unlikely that simple neuritis, idiopathic or even specific in character, was present. It is unusual to find such a chain of symptoms from an uncomplicated inflammation attacking the nerves here involved. Doubtless, as in the cases of Coupland and of Robinson and Hutchinson, the nerves were compressed and inflamed in varying degrees, but these conditions were secondary.

The local examination alone was almost sufficient to exclude a gross orbital lesion. Aneurism was suggested, but no bruit, tinnitus or other distinctive symptoms lent support to the diagnosis. A basal tumor, next to the diagnosis settled upon, is the most probable; but among other reasons for deciding against it are the close localization of the lesion to the region of the cavernous sinus, and the absence of optic neuritis.

Against nuclear ophthalmoplegia several important points can be made. This is most frequently due to slow progressive degeneration. The case progressed slowly enough to dismiss the idea of an acute nuclear apoplexy, and yet did not take the usual course of chronic nuclear paralysis. Usually nuclear cases are or become bilateral. The nuclei of the fifth are not, as a rule, involved. The first nerves involved are those associated in functioning, not necessarily those which lie closest together, and usually ophthalmoplegia interna is not present. The occurrence of pain and tenderness, and the great improvement under treatment, are also in favor of the diagnosis given, and against nuclear disease.

The importance of early, positive treatment with specific remedies in such cases, is indicated by this history and also by the records of other cases.

[As the proof of this paper is passing through my hands, I have taken occasion to again examine this patient, and find that she has recently greatly improved. The mercurial inunctions were stopped, but the sodium iodide was continued and is still

administered. The ophthalmoplegia is now plainly decreasing. She can elevate the lid to about one-third the usual height and can move the eye slightly in all directions—most upwards, and least outwards. The left pupil is smaller than the right, but responds to light. She remains, however, blind in the left eye. The area of impairment of sensation has further contracted, and is now confined to the forehead, upper eyelid and conjunctiva, and on the forehead spots where sensation is returning are to be found.]

